

III. Remarks**A. Claim Amendments**

Claims 1, 12 and 14 have been amended as set forth above and described below.

Independent claim 1 has been amended to make it clear that the standard value is the reference for the detected gradation of the particular portion of the picture of the specimen.

Independent claim 12 has been amended to make it clear that the detecting means detects the average and deviation of the gradation of the picture of the specimen, and that the correcting means corrects the gradation of said X-ray picture so as to make the average and deviation of the gradation of the picture of the specimen as detected by the detecting means comply with a standard average and a standard deviation to which the detected average and deviation are referenced, respectively.

B. Rejection under 35 U.S.C. § 103

The Action rejects claims 1, 6-7, 9-10, 12-14 and 16-17 as being obvious from Lang et al. (WO 02/30283 A2). Claims 8 and 15 are rejected as being obvious from Lang et al. in view of Inoue (US 6,819,794). Reconsideration and withdrawal of this rejection are respectfully requested in view of the foregoing amendments and the following arguments.

According to amended claim 1, the gradation of a particular portion of the picture of the specimen in the X-ray picture is detected by the detecting means. The gradation of the picture of the X-ray picture is corrected by the correcting means such that the detected gradation of the particular portion of the picture of the specimen complies with the standard value to which the detected gradation of the particular portion is referenced. Then, bone mineral density evaluation is carried out by the evaluation means based on the corrected gradation of a particular region of the picture of the mandible, or, more specifically, the picture of the region including the alveolar bone portion around the first premolar, in the gradation corrected X-ray picture. In other words, the particular portion of the picture of the specimen in the X-ray picture is used as an index for correcting the gradation of the entire X-ray picture. The bone mineral density is evaluated by the

evaluating means based on the corrected gradation of a particular region, i.e., the gradation of the picture of the region including the alveolar bone portion around the first premolar of the mandible. The particular portion (i.e., the portion of the picture of the specimen for which the detecting means detects gradation) is different from the particular region (i.e., the alveolar bone portion around the first premolar of the mandible) of the gradation corrected X-ray picture.

In rejecting claim 1, the Examiner finds that the “trabecular” of Lang et al (Page 18, line 8) corresponds to the “specimen” of claim 1. However, the specimen object used by Lang et al. for any correction is the “calibration phantom” of Lang et al. that is positioned with respect to a trabecular bone portion of the mandible, not the trabecular bone itself. (Page 18, Lines 20-22). Certainly an image of the bone is not calibrated against itself.

The Examiner also finds that the “detecting means” of claim 1 is found in the “detector system or a storage plate for digital x-ray imaging . . .” disclosed by Lang et al. at Page 16, Lines 5-14. However, the “detector system” of Lang et al. is a detector system that detects an X-ray, and the “storage plate” is for storing digital X-ray images. Neither of these devices is a detecting means of claim 1. The detecting means of claim 1 is used to detect the gradation of the particular portion of the image of the specimen which serves as an index for use in correcting the gradation of the X-ray picture. Lang et al. does not disclose that this “detector system” or “storage plate” detects “the gradation of the picture” of the “calibration phantom” (i.e., specimen) as claimed and, therefore, does not disclose the “detecting means” of claim 1 of the present application.

Further, the Examiner states that Lang et al. discloses “correcting means” recited in claim 1 of the present application by its disclosure at Page 21, Line 9 of “correct for soft tissue measurements.” However, correcting the “soft tissue measurements” as disclosed by Lang et al. is completely different from the correction made by the “correcting means” of claim 1 of the present application. Lang et al. corrects to remove effects of “soft tissue” contained in the x-ray picture (i.e., effects given when x-raying) which would be seen when data derived from the x-ray picture are analyzed. On the other hand, the “correcting means” of claim 1 is used to correct the gradation of the X-ray picture by the use of the particular portion of the specimen (not soft

tissue) as an index in such a manner that the gradation of the index can comply with the standard value. Simply, disclosure of “correct[ing] for soft tissue measurements” does not disclose “correcting the gradation of said X-ray picture so as to make the gradation of said particular portion of said picture of said specimen as detected by said detecting means comply with a standard value to which said gradation of said particular portion is referenced” as claimed. As such, the correcting means of claim 1 is not disclosed by correction made by Lang et al.’s system.

The Examiner also states that the evaluating means of claim 1 is disclosed in Lang et al. at Page 21, Lines 9-10 in terms of “evaluate bone density and structure of the image”, and that the “particular region” to be evaluated by the evaluating means of claim 1 corresponds to the “anatomical region” mentioned at Page 32, line 2. The claimed evaluating means evaluates bone mineral density on the basis of the corrected gradation provided by the correcting means. However, as discussed above, Lang et al. does not specifically disclose the claimed “correcting means” and thus does not disclose the corrected gradation of the X-ray picture as claimed. It follows that Lang does not disclose the claimed “evaluating means” that uses the corrected gradation from the correcting means as recited in the claim. In other words, Lang et al. does not perform the correction as done by “correcting means.” Accordingly, the result of any evaluation of the “anatomical region” in Lang et al. would necessarily be different from the result of the evaluation of the “particular region” performed by the claimed evaluation means after correction by the claimed correcting means as claimed in claim 1. It should be noted that the reason why claim 1 recites “said particular region includes a region corresponding to an alveolar bone portion around a first premolar” as a requirement of the invention is that the bone mineral density of the alveolar bone around the first premolar is closely related to the bone mineral density of the human body as a whole. Lang et al. illustrates no appreciation for this point.

As elaborated above, Lang et al. does not disclose or suggest several of the features of the invention. Accordingly, claim 1 and claims 6-10, which depend from claim 1, are in allowable form.

According to claim 12, the average and deviation of the gradation of the picture of the specimen are detected by the detecting means, and the gradation of the X-ray picture is corrected by the correcting means in such a manner that the average and deviation of the gradation of the picture of the specimen as detected by the detecting means comes to comply with the standard average and deviation to which the average and deviation of the gradation of the picture of the specimen are referenced. Evaluation of the bone mineral density by the evaluating means is carried out based on the corrected gradation of the particular region of the mandible or, more specifically, the region including the alveolar bone portion around the first premolar, in the gradation-corrected X-ray picture. It should be noted that the gradation of the picture of the specimen varies from portion to portion. According to the above-discussed claim 1, the gradation of the X-ray picture is corrected with the particular portion of the picture of the specimen, but, according to claim 12, the average and the deviation of the gradation of the picture of the specimen having a gradation varying from portion to portion are detected, and the gradation of the X-ray picture is corrected, using the detected average and deviation as an index, or, more specifically, the gradation of the X-ray picture is so corrected that the detected average and the detected deviation can comply with the standard average and the standard deviation, to which the average and the deviation are referenced. Then, the bone mineral density is evaluated from the gradation of the picture of the region including the alveolar bone portion around the first premolar of the mandible, which is the particular region, different from the particular portion of the picture of the specimen, of the corrected X-ray picture.

The Examiner finds that the “specimen” recited in claim 12 corresponds to the “trabecular” in Lang et al. (Page 18, Line 8), but as discussed above the “specimen” used by Lang et al. is the “calibration phantom” not the trabecular. The Examiner finds that the “detecting means” recited in claim 12 is also disclosed by Lang et al. (“detector system or a storage plate for digital x-ray imaging . . .” in Page 16, Lines 5-14), but Lang et al. discloses nothing about detecting the gradation of the “calibration phantom”, much less detecting the average and deviation of the gradation of the picture of the “calibration phantom.” Further, as discussed above, the “detector system” of Lang et al. is a detector system that detects an X-ray, and the “storage plate” is for storing digital X-ray images. Neither of these devices is a detecting

means of claim 12. The detecting means of claim 12 is used to detect the average and the deviation of the gradation of the image of the specimen which is used as the index when the gradation of the X-ray picture is corrected.

Moreover, the Examiner finds that the average and the deviation of the gradation as detected by the detecting means recited in claim 12 correspond to the “mean pixel density” and the “variance of pixel intensity” of Lang et al. (Table 1, Pages 38-39). However, the “mean pixel intensity” and the “variance of pixel intensity” relied upon by the Examiner are those of the “ROI” (regions of interest), which is considered to be contained in the “anatomical region” to be evaluated, and not that of the specimen as recited in claim 12. As such, Lang et al. neither disclose nor suggest the “detecting means” of claim 12.

With regard to the “correcting means” recited in claim 12, the Examiner states that it is disclosed by Lang et al. (“correct for soft tissue measurements” in Page 21, Line 9), but correcting “soft tissue measurements” as disclosed by Lang et al. is completely different from the correction made by the “correcting means” of claim 12 of the present application. As discussed above, Lang et al. corrects to remove effects of “soft tissue” contained in the x-ray picture (i.e., effects given when x-raying) which would be seen when data derived from the x-ray picture are analyzed. On the other hand, the “correcting means” of claim 12 is used to correct the gradation of the X-ray picture by the use of the average and deviation of the gradation of the specimen (not soft tissue) in the x-ray picture as an index in such a manner that the index can comply with the standard average and standard deviation to which the index is referenced. Simply, disclosure of “correct[ing] for soft tissue measurements” does not disclose “correcting means for correcting the gradation of said X-ray picture so as to make the average and the deviation as detected by said detecting means comply with a standard average and a standard deviation to which said detected average and said detected deviation are referenced, respectively” as claimed in claim 12. As such, the correcting means of claim 12 is not disclosed by correction made by Lang et al.’s system.

The Examiner also states that the evaluating means of claim 12 is disclosed in Lang et al. at Page 21, Lines 9-10 in terms of “evaluate bone density and structure of the image”, and that the “particular region” to be evaluated by the evaluating means of claim 12 corresponds to the “anatomical region” mentioned at Page 32, line 2. The claimed evaluating means evaluates bone mineral density on the basis of the corrected gradation provided by the correcting means. However, as discussed above, Lang et al. does not specifically disclose the claimed “correcting means” and thus does not disclose the corrected gradation of the X-ray picture as claimed. It follows that Lang does not disclose the claimed “evaluating means” that uses the corrected gradation from the correcting means as recited in the claim. In other words, Lang et al. does not perform the correction as done by “correcting means.” Accordingly, the result of any evaluation of the “anatomical region” in Lang et al. would necessarily be different from the result of the evaluation of the “particular region” performed by the claimed evaluation means after correction by the claimed correcting means as claimed in claim 12.

Further, as discussed above in connection with claim 1, claim 12, too, recites that the particular region evaluated by the evaluating means “includes a region corresponding to an alveolar bone portion around a first premolar.” The bone mineral density of the alveolar bone around the first premolar is closely related to the bone mineral density of a whole human body. As discussed above, Lang et al. illustrates no appreciation for this point.

For the foregoing reasons, Applicant submits that these features of amended claim 12 are neither disclosed nor suggested by Lang et al. alone or in combination with Inoue or the other art of record. As such, claim 12 and claims 13-17, which depend from claim 12, are in allowable form.

IV. Conclusion

In view of the foregoing remarks and amendments, Applicant submits that this application is in condition for allowance at an early date, which action is earnestly solicited.

The Commissioner for Patents is hereby authorized to charge any additional fees or credit any excess payment that may be associated with this communication to deposit account 04-1679.

Respectfully submitted,

Dated: February 22, 2010



Joseph A. Powers, Reg. No.: 47,006
Attorney For Applicant

DUANE MORRIS LLP
30 South 17th Street
Philadelphia, Pennsylvania 19103-4196
(215) 979-1842 (Telephone)
(215) 979-1020 (Fax)